

unlikely to emerge or be accommodated by a wide-area PCS licensee absent the creation of open and competitive interfaces between those licensees and prospective unlicensed service providers.

3. Need for Interference Protection

The third defining element of Specialized PCS services is the need for the users of those services to receive protection from possible interfering uses. This need can arise either from the criticality of the application (for example, mobile telemetry services in health care applications) or simply from the end users' need for adequate assurance to drive their investment decisions. In the former case, certain specialized applications, such as health care and public safety uses, require interference protection given the need for high reliability. In the latter case, in CYLINK's experience as a Part 15 equipment vendor, many prospective customers of unlicensed products will view a lack of interference protection as a severely limiting factor in the possible uses of an unlicensed low power PCS product. In either case, the absence of interference protection for specialized PCS products will limit the ability of small equipment manufacturers, like CYLINK, to identify and address niche PCS equipment markets.

IV. THE AMT/DSST PROPOSAL

In their Joint Comments and Joint Reply, AMT and DSST proposed that the FCC designate one PCS licensee in each market to serve as a host licensee for the provision of Specialized PCS services by unlicensed PCS service providers ("PSPs").¹³ The host licensee would provide the platform services necessary to enable the PSPs to build and commercially provide their own specialized PCS services. The relationship between the host licensee and its PSPs would function much like the relationship between Enhanced Service Providers ("ESPs") and the underlying carriers from whom they obtain transmission capacity.¹⁴ This relationship would be contractual in nature and would be governed by open network principles that require the host licensee to make available to the PSPs non-discriminatory access to the basic building blocks of PCS service.¹⁵

¹³In the alternative, the Commission could allocate a separate block of spectrum from the Emerging Technologies band that was not proposed for either licensed or unlicensed PCS by the PCS NPRM. In this event, AMT and DSST believe that the minimum amount of spectrum feasible for implementation of the Specialized PCS Service would be 20 MHz. Because of the localized nature of most specialized PCS applications, AMT and DSST believe that licensing of the Specialized PCS Host should be by markets no larger than the Rand McNally Basic Trading Areas ("BTAs").

¹⁴Joint Comments at 9-14.

¹⁵Expanded Interconnection with Local Telephone Company Facilities (Amendment of Part 36), FCC 92-441 (October 16, 1992); Expanded Interconnection with Local Telephone Company Facilities (Amendment of Part 69), FCC 92-440 (October 19, 1992); Amendment of Section 64.702 of the Commission's Rules and Regulations (Third Computer Inquiry), Phase I, CC Docket 85-229, 104 FCC 2d 958 (1986), recon., 2 FCC Rcd. 3035 (1987), further recon., 3 FCC

The two most basic building blocks of Specialized PCS services are frequency access and frequency coordination. Each host Specialized PCS licensee would be required to provide its PSPs access to its licensed spectrum. The host licensee could itself provide service as a PSP, but would initially be limited to operations on no more than 5 to 10 MHz of its licensed bandwidth. PSPs that successfully identified and met a specialized PCS demand could be expected to require more spectrum over time. Conversely, PSPs that provided a service for which there was inadequate market demand ultimately would relinquish their spectrum, thus ensuring that the Specialized PCS licensee could dynamically accommodate within the limits of its bandwidth emerging and growing Specialized PCS requirements.

Each Specialized PCS licensee, moreover, would be required to construct such facilities and provide such services as necessary to ensure effective frequency coordination and re-use between its PSPs. For this purpose, the Specialized PCS licensee would operate within its market area much like the "open industry entity" proposed by the Unlicensed PCS Ad Hoc Committee For 2 GHz Microwave Transition And Management ("UTAM") to manage

Rcd. 1135 (1988), second further recon., 4 FCC Rcd. 5927 (1989), vacated sub nom., California v. FCC, 905 F.2d 1217 (9th Cir. 1990), pet. for rev. pending sub nom. Illinois Bell Telephone Co. v. FCC, No. 88-1364 (D.C. Cir.); Phase II, 2 FCC Rcd. 3072 (1987), recon., 3 FCC Rcd. 1150 (1988), further recon., 4 FCC Rcd. 5927 (1989), vacated sub nom. California v. FCC, 905 F.2d 1217 (9th Cir. 1990); Computer III Remand Proceeding: Bell Operating Company and Tier I Local Exchange Company Safeguards, 6 FCC Rcd. 7571 (1991), pets. for recon. pending, pets. for rev. pending sub nom. California v. FCC, No. 92-70083 (9th Cir.), California v. FCC, no. 92-70105 (9th Cir.).

the band-clearing process and coordinate the deployment of unlicensed PCS devices and services. The frequency coordination function performed by the Specialized PCS licensee, moreover, would be closely analogous to that performed by the licensees of radio local area networks in the 18 GHz Digital Termination Service ("DTS") band. See Amendment of Part 94 of the Rules Regarding Point-to-Multipoint Use of the 2.5, 10.6 and 18 GHz Bands by Private Operational Fixed Microwave Licensees, 5 FCC Rcd. 1220, 1223 (1990).

In the event that the Specialized PCS licensee itself provided service as a PSP, it would, in turn, be required to unbundle and make available to other PSPs the basic functions or modules that the host employed within its service. Although the application of open network principles may vary slightly with the exact architecture chosen by a particular host, a PCS network serving a metropolitan area typically may consist of the PCS radios used by subscribers, individual base station units covering a small geographic area that provide radio links to and from the subscriber units, base station controllers that provide a portion of the necessary network control function for groups or clusters of base station units, wireline or other transmission facilities between the base station controllers and the central switching system, and, finally, the central PCS switching system. Using Intelligent Network (IN) terminology, the PCS switching system would consist of higher level, service logic (SL) and data bases and processors associated with the applications functions

and the basic call processing (BCP) functions associated with lower level, network operating system functions. The PSPs would be able to choose among these modules in order to provide specialized services to the public at large, to a segment of the public with unique needs, or to meet their own internal, private needs.¹⁶

The Specialized PCS proposal as described herein and in the AMT/DSST Joint Comments and Joint Reply would allow a PSP, for example, to provide one or two base stations and connect them to the balance of the network. This would work in analogous fashion to the manner in which customer owned, coin operated telephones are connected to the wireline telephone network today and would provide opportunities for small or medium-sized entrepreneurs to enter the PCS market on a dynamic basis. Perhaps even an individual home-owner near a busy intersection would operate as a PSP a base station for public access to the network (with the host licensee providing subscriber validation, billing, and switching functions). Other PSPs might negotiate the right to provide public PCS services in a privately owned building complex such as a shopping mall, industrial park, sports arena, or office building. The owners of such complexes might chose to operate as PSPs and provide the service themselves.

¹⁶AMT and DSST recognize that the relationship between the Specialized PCS host and its PSPs must be defined through an evolutionary process in the further rulemaking requested herein. AMT and DSST commit their efforts to working toward an optimal definition of that relationship and the Specialized PCS Service that will enable all parties to flexibly respond to market conditions.

Moreover, either the entrepreneurs, the real estate owners or the tenants might chose to provide services on both a public or private (i.e., equivalent to a wireless PBX) basis.¹⁷

**V. ESTABLISHMENT OF SPECIALIZED PCS WOULD
PROMOTE THE PARTICIPATION OF SMALL
BUSINESSES IN PCS**

The defining challenge confronted by the FCC implementing a competitive bidding licensing process is the establishment of mechanisms that will ensure the continuing meaningful participation of small businesses and businesses owned by members of minority groups and women in the provision of spectrum-based services and in the associated equipment markets. Small businesses and entrepreneurs, indeed, have historically occupied a central role in the development and deployment of new technologies. Exhibit 3 to this Joint Petition documents the contributions of small businesses to the nation's economy, including the conclusions that:

- Small firms innovate at a per person rate twice that of large firms. In a study conducted for the SBA by the Futures Group, a total of 8,074 innovations were identified and then grouped by firm size. By comparing total employment of the innovating enterprises in the 362 industries with the total number of innovations, the Futures Group found that there were only 313 innovations per million employees for large firms and

¹⁷As a further example, a PSP might want to provide customized Service Logic software and data base functions utilizing the host licensee's switch in order to offer customized services such as Virtual Private Network offerings. In such a case, the PSP might or might not operate his or her own base stations.

745 per million employees for small firms.¹⁸ Small firms were estimated to be responsible for 55 percent of all innovations.¹⁹

- Small business spends proportionately more on R&D than large firms. On average, small firms spent 4.7 percent of their revenue on R&D activity, as opposed to 3.1 for large firms.²⁰
- Small business spends proportionately twice as much of their R&D dollars on fundamental research as large firms. Six percent of all small firm²¹ R&D funds in 1981 were spent on basic research while large firms spent only 3 percent.²² Small firms spent 28 percent of their R&D funds on applied research; large firms spent 20 percent. Large firms, on the other hand, outspent small firms on development, 77 percent to 66 percent.
- Small firms translate R&D spending into new products more efficiently than large firms. A National Science Foundation study found that smaller firms had 2.1 new products per \$1 million of R&D, 3.5 times the rate for all firms.²³ The average number of new products introduced in 1985 per \$100 million in sales was 12.2 for small firms and 5.0 for large firms.²⁴

¹⁸The Futures Group, *Characterization of Innovations Introduced on the U.S. Market in 1982*, U.S. Small Business Administration, Office of Advocacy, 1984, p. 4.

¹⁹Id.

²⁰National Science Foundation, *Utilization of New Data for the Assessment of the Level of Innovation in Small American Manufacturing Firms*, 1991, p. 6.

²¹For the purposes of this study a small firm was defined as having 1,000 or fewer employees.

²²U.S. National Science Foundation, Trends to 1982: in Industrial Support of Basic Research, NSF 83-302, 1983, Table B-2.

²³National Science Foundation, supra note 18, at 5.

²⁴Id.

- Employment in a small firm was 22 percent more likely to increase as a result of innovation than was employment in a large firm.²⁵

AMT and DSST respectfully suggest that establishment of the Specialized PCS Service consistent with the proposal herein will enable the Commission to ensure the vibrant and on-going participation of small businesses and entrepreneurs in the development and deployment of PCS products and services.

At the outset, the Specialized PCS Service is, in fact, a market solution and would provide small businesses and businesses owned by members of minority groups and women access as PSPs to potentially thousands of specialized service and equipment markets.²⁶ The specialized service markets, with principally localized service areas, will not have the large capital requirements or other barriers to entry that characterize the provision of broad service offerings over ubiquitous networks. Similarly, the specialized equipment markets will not lend themselves as readily to the techniques of mass production

²⁵The Futures Group, *supra* note 16, at 14.

²⁶The small business unlicensed service providers operating under the Specialized PCS host's umbrella, moreover, would better understand the specialized communications needs of other small businesses within its market area. Accordingly, implementation of the Specialized PCS proposal would also improve the quality of communications services available to small businesses and reduce any relative competitive disadvantage those businesses may suffer due to an inability to obtain communications services and options comparable to those available to large firms. See Gorosh, "Small Businesses, Telecommunications and Economic Development: The Need to Lift Regulatory Restrictions on the Sharing and Use of Telecommunications Services," 29 Cal. W. L. Rev. 393 (1993) (describing state regulatory restrictions which limit small business access to advanced telecommunications services).

and thus are more likely to result in domestic employment by U.S. concerns than are the equipment markets for ubiquitous products.

Moreover, the AMT and DSST proposal would not only accommodate an entire family of specialized PCS services, it would provide the continuing competitive spur of new entry. In other words, it would provide not only for a wide selection of specialized PCS services, but also offer opportunities for a wide range and continually evolving set of specialized service providers. Thus, small businesses would have a on-going opportunity and incentive past the initial licensing phase to innovate new services and products.

As documented in Exhibit 2 to this Joint Petition, AMT's and DSST's Specialized PCS proposal is thematically true to years of FCC precedent promoting the entry and growth of small businesses in communications markets. By implementing two main policies, (1) the opening of ubiquitous networks and (2) the accommodation of specialized or niche communications systems or networks to compete with those networks, the Commission has fostered an increasingly vibrant and competitive marketplace populated by firms of all sizes. These policies, in turn, have engendered the development of many new services and products, greatly enhanced customer choice and promoted U.S. competitiveness in the Global economy.

The FCC has applied its policies of openness and specialization over the years to engender healthy competition among firms of all sizes in the Radio Common Carrier, Specialized

Common Carrier, Interexchange, Specialized Mobile Radio and other markets. The Commission similarly has opened equipment market opportunities for small businesses through its policies concerning the interconnection of Customer Premises Equipment and the manufacturing of unlicensed Part 15 equipment. Both CYLINK and AMT, indeed, owe their existence to these pro-competitive policies.

Many of the small firms that have entered the communications markets opened by the Commission's policies have built businesses, niche by niche, that now occupy a central role in the economy. Examples of these include MCI and McCaw. Other small firms have built successful, yet modestly-sized, businesses that supply many vital, specialized services and greatly enhance customer choice and product diversity.

AMT and DSST thus view their Specialized PCS proposal as simply the application of established and proven policies to the PCS context. The establishment of the Specialized PCS Service will provide small firms an entry point into the PCS industry on an evolving basis. The entry of these firms into the industry, in turn, will accommodate a demand for specialized services that will be inadequately addressed by ubiquitous service offerings of regional or nationwide networks.

AMT and DSST recognize that the Commission may consider other options for promoting small business participation in PCS as well, including, for example, a specific small business set aside and bidding preferences. AMT and DSST do not suggest here

that adoption of their Specialized PCS proposal should be preclusive of other measures. To the contrary, AMT and DSST encourage the Commission to consider all available options. AMT and DSST believe, however, that accommodation of specialized PCS services is necessary ultimately to fulfill the Congressional mandate of the Budget Act.²⁷

²⁷AMT and DSST note that measures designed to promote the participation of small businesses in PCS at the initial licensing phase ultimately would not ensure continuing opportunities after the initial licensing. Thus, while policies like set asides and bidding preferences may help define a set of small business "winners," they do not provide a continuing incentive to small firms to innovate new services and products. Absent unique restrictions on the transfer of small business licenses, a set aside or bidding preference would not prevent the post-construction consolidation of the PCS licenses by larger entities. In any event, policies tied solely to facilitating the ability of small businesses to submit a successful bid at auction require that the FCC define "small business" in the PCS context without the benefit of operational experience. Any such attempt at defining small business in the PCS context requires line drawing that again will define a set of regulatory winners and losers, but will not provide the continuing incentive required to ensure the meaningful participation of small businesses in the industry. Only a market-based solution, such as the accommodation of small business entry into the many specialized and niche PCS businesses, will provide the continuing incentives to small businesses needed to ensure their meaningful participation in the PCS industry past the initial licensing phase.

VI. ESTABLISHMENT OF SPECIALIZED PCS WOULD
FURTHER THE GOALS OF THIS PROCEEDING

In its PCS NPRM, the Commission identified its four principal objectives in promulgating PCS service rules. These are: (1) universality of service availability, (2) speed of deployment, (3) diversity of services and (4) competitive delivery. These goals were recently affirmed in the PCS First Report and Order.

1. Establishment of Specialized PCS Will Promote
The Universality of Service Availability

The Commission has made clear its intent to craft service rules in this proceeding that promote the broad availability of a family of PCS services. AMT and DSST have crafted their proposal to respond to an identified demand for emerging specialized services, and to flexibly accommodate new services as they continue to emerge. In addition, by creating a point of entry in PCS for unlicensed service providers, the designation of a Specialized PCS licensee in each market will provide multiple sources of delivery and spur the availability of new services. Indeed, establishment of Specialized PCS would provide end users the additional service option of satisfying their internal business needs by operating as a PSP.

Moreover, in AMT's and DSST's view, to further the goal of universal availability, the PCS service rules must dynamically accommodate emerging services and technologies after the initial licensing phase. Adoption of the Specialized PCS proposal set forth herein would enable the commercial development

and deployment of a host of specialized PCS services by the PSPs, thereby ensuring that the system and service choices of the PCS licensees do not limit the menu of available services to high-end, high-cost services that, in any case, may not meet their specialized needs.

2. Establishment of Specialized PCS Will Speed
the Deployment of New PCS Services

The designation of a Specialized PCS licensee will enhance the speed of deployment of new PCS services by providing a test bed for new service providers to commercially deploy their services without first obtaining an independent spectrum allocation from the Commission. PSPs would be more likely to timely obtain adequate sources of capitalization to develop their products and services given the availability of a mechanism for immediate commercial deployment. In any event, by providing PSPs the opportunity to deploy their services commercially, the Commission will ensure that a closed set of PCS licensees do not define the range of available services based upon their embedded technology, nor otherwise dictate the speed of deployment of new competitive services.

3. Establishment of Specialized PCS Will Promote
Diversity of Services

Adoption of the Specialized PCS structure proposed herein will promote the diversity of PCS service options both by creating a class of new service providers (PSPs) and by assuring that the specialized communications needs of PCS customers are accommodated. To this end, the HAI Study attached hereto as

Exhibit 1 identifies specialized health care, home care, public and personal safety and educational applications, among others. PCS customers, moreover, could effectively unbundle PCS services by choosing to operate as a PSP in meeting internal PCS needs.

4. Establishment of Specialized PCS Will Promote the Competitive Delivery of Services

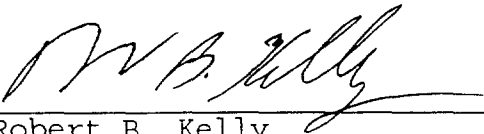
Finally, the designation of a Specialized PCS licensee to serve as a host for unlicensed PSPs will enhance competition by opening entry into the commercial PCS marketplace to the PSPs. Competition will be further enhanced by the competitive responses of existing PCS, cellular and other licensees to the potential development of new markets and new market entrants by the PSPs.

The designation of a Specialized PCS host licensee generally would serve the public interest by establishing a dynamic mechanism within the PCS allocation for the marketplace to operate to effectively allocate the PCS spectrum to its highest valued use free of delay from regulatory processes. PSPs providing services not valued by the marketplace would be unwilling or unable to continue their contractual relationship with the host licensee, and would therefore relinquish their use of the spectrum. Conversely, PSPs providing highly valued services would be rewarded with the ability to dynamically grow those services in response to market demand by accessing more capacity from the host licensee.

VII. CONCLUSION

For the reasons stated herein and in the attached Exhibits 1 through 3, AMT and DSST respectfully petition the Commission to issue a Notice of Further Proposed Rulemaking in this proceeding proposing to promote the participation of small businesses and businesses owned by members of minority groups and women in the emerging PCS marketplace through the establishment of the Specialized PCS Service.

Respectfully submitted,
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August 25, 1993

EXHIBIT 1

AN ANALYSIS OF THE NEED FOR SPECIALIZED PCS SYSTEMS/SERVICES

Prepared by

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August 19, 1993

I. INTRODUCTION

Hatfield Associates, Inc. (HAI) was asked by Advanced MobileComm, Inc. (AMI) and CYLINK to undertake a brief study of Specialized Personal Communications Services (Specialized PCS). In AMI/CYLINK's terminology, a Specialized PCS system encompasses a range of services characterized by (1) the need for interference protection, (2) the need for customization and specialization, and (3) a requirement for only limited coverage. That is, they serve customer requirements that cannot be effectively or efficiently met on systems designed to serve more ubiquitous, generic needs of the general public. An important aspect of these customized and specialized systems is that they can be technically configured for optimum performance in different applications, as opposed to generic systems designed to serve the more general needs of the public. For example, intrasystem interference protection, signal quality, signaling rates, and other performance-determining parameters of a Specialized PCS system can be optimized for differing applications. In the past, the Federal Communications Commission (FCC or the Commission) has recognized the need for such specialized services in, for example, the long haul communications and mobile radio area through spectrum allocations and associated rules for Specialized Common Carrier (SCC) systems and Specialized Mobile Radio (SMR) systems respectively.

The purpose of the study was two-fold: first, to identify potential short-range services whose requirements do not lend themselves to generic solutions and, two, to analyze whether or

not the services identified need the protection against interference that is offered by licensing. The study was carried out by conducting a systematic search of trade and professional journals (as well as a more limited search of the popular press) for articles and papers dealing with wireless systems and services. This report sets forth the results of that study.

The balance of the report is composed of two parts. Section II lists and describes services that meet the established criteria. The services are categorized into health care, public/personal safety, educational, business, and wireless access. Section III sets forth the conclusions of the study.

II. SPECIALIZED PCS SERVICES

In the balance of this section, services are identified that may not be efficiently or effectively served by generic systems intended to serve the more general needs of the public on a wide-coverage basis.

A. Health Care Applications

Presently, many hospitals and other healthcare facilities make use of devices operating on licensed UHF splinter frequencies or in unlicensed Part 15 spectrum. Applications include heart monitoring, remote telemetry, home care, online access to data bases, and bedside patient recordkeeping. Neither the use of licensed splinter frequencies, or the use of unlicensed Part 15 frequencies offers these organizations either long term or short term exclusivity in the use of the spectrum. Hence, they are subject to interference from other users of the spectrum. In some cases, the devices are used for biomedical

telemetry, including the telemetering of such vital signs as electrocardiogram signals. Such life threatening situations certainly require that the equipment operate with a very low probability of interference. That is, they require operation within licensed spectrum where the control of interference is surely mandatory.

Moreover, these healthcare applications are by their very nature specialized and they may not be effectively or efficiently served by more generic systems optimized to meet the more generalized needs of the public. For example, a public network may be designed for a certain level of blocking probability -- i.e., the probability that a user will be denied access to (or delayed in accessing) a system. While this probability or delay may be perfectly suitable for general use, it may be totally unsuitable for life threatening situations. Likewise, the probability of receiving errors or requiring message retransmissions may be unsuitable on a generic system. Furthermore, the range of operation of these systems may be quite short and, consequently, there may be no need for the service beyond the boundaries of a particular facility. In such a situation, construction of an entire network on a licensed basis to provide such a specialized, local service would clearly not be cost-effective or represent efficient use of the spectrum resource. In terms of spectrum efficiency, it would be better to reuse the same spectrum in different local areas for the differing requirements. In other words, on a licensed basis, the

spectrum used for a specialized healthcare system could be used just down the street from a specialized industrial system (e.g., in warehouse automation).

In short, healthcare applications clearly demonstrate that there is a need for specialized, licensed, systems because their requirement cannot be effectively and efficiently met by unlicensed, short range PCS systems nor by licensed, longer range generic systems designed to serve less specialized requirements. In any event, the customer will be best served by having a choice between less expensive, unlicensed systems/services and more expensive, wider-coverage systems of a more generic character.

B. Public/Personal Safety Applications

As in the case of healthcare, there are a myriad of potential Specialized PCS applications in the public/personal safety field. Applications include in-prison secure communications and surveillance systems, Intelligent Vehicle Highway Systems (IVHSs), home monitoring of prisoners on probation, various in-building and alarm systems and child location and proximity systems. Unlicensed Part 15 devices are currently being used to transmit intrusion, fire, and other alarms within buildings or building complexes. Other specific applications include a system that allows a prison guard to summon aid if he or she is threatened by inmates. This is accomplished by the guard activating a small radio device carried on his or her person. Similar systems are used to summon medical attention. Systems have also been proposed for automated toll

collection, and wireless systems could also be used by parents to keep track of their children.

Some of these applications are not critical in the sense that they are associated with life-or-death situations while others, like the devices used by guards to summon aid, are. Furthermore, they also share the common attribute that the application is very localized and specialized in nature so that they may not be well served by a generic system. This suggests, once again, the need for a licensed, short-range, Specialized PCS.

C. Educational Applications

Campus-wide networks can be configured in a number of ways using a combination of wireless systems. Such networks come in many forms: point-to-point links, point-to-multipoint or "star" links from a single hub side, peer-to-peer networks with no central hub, and, of course, various combinations of these. Most of the data in these networks are packetized; however, there are a number of voice and video systems that require dedicated circuit-switched full duplex circuits. Some of the less critical requirements for campus-wide networks can be met by unlicensed, short-range systems and some more critical requirements by licensed, wide-coverage systems (e.g., by a commercial mobile data system), but it is clear that there is also a need for a licensed, short-range, Specialized PCS.

D. Business Applications

There appears to be an almost unlimited number of short-range applications in business and industrial applications. These applications include (a) in-plant monitoring, telemetry, and communications, (b) process control, (c) robotics and automated warehouses, and (d) a host of miscellaneous applications ranging from wireless headsets used at fast-food restaurants to wireless microphones used at rock concerts. Specific applications include, for example, communications with lift truck operators in warehouses, communications among buildup/tear down crews working in places like sports pavilions or convention centers, and factory data networks (especially where production equipment is rearranged frequently to meet changing orders), wireless bridges used to provide quick and easy linking of wired or wireless LANs located in different buildings, and wireless "point-of-sale" networks used for such things as "cash" registers, bar code readers, and menu pads. As a more specific example of the latter, a clerk using a single handheld wireless device could scan in prices, take credit card payment, record the sale, and update inventory records.

These applications are so diverse that it is highly unlikely that a system designed to serve more generic needs will be effective and efficient. This is true even of systems like wireless LANs because they are typically designed to serve generic business needs and not the specialized needs for data

communications in a process control system at an oil refinery or chemical plant for example.

E. Wireless Access to the Public Switched Telecommunications Network

The use of cordless telephones has proliferated extremely rapidly in recent years. In the U.S. over 20 million cordless telephones were sold in 1992, an increase of 20 percent over the number sold in 1991. One spread spectrum cordless telephone for operation under Part 15 (unlicensed devices) is now on the market in the U.S. It is HAI's understanding that at least two other manufacturers will be marketing such cordless telephones by the end of 1993. Most of this rapidly growing market is in the higher end of the price range for this type of product where customers are demanding much better quality communications. Similarly, an increasing number of PBX and key telephone systems offer wireless alternatives to costly and inflexible inside wiring in business applications.

In less critical situations, unlicensed systems of this type may be perfectly adequate and, if the user has a requirement for public (i.e., Telepoint-type) access to the telephone network, commercial providers of public PCS services may be appropriate. But, in certain critical applications, the protection against interference that licensing provides may be needed, but there may be no need for public (i.e., "pay-phone-like") access to the public switched telecommunications network outside the immediate work environment. For example, through its consulting activities, HAI is aware of applications involving communications

during the emergency shut-down of chemical processing plants. Since the system is primarily used for in-plant communications and as a backup for wired systems under emergency conditions, there is a need for interference protection but no need for access to the public network beyond the immediate vicinity of the plant. In general, the customer would be better served by having a choice lying between unlicensed, short-range services and licensed, wide-coverage, public systems, and a Specialized PCS system would provide exactly that choice.

III. CONCLUSIONS

Based upon a review of the requirements for existing and prospective PCS systems and services, it is apparent that there is a need for the Specialized PCS systems envisioned by AMI/CYLINK. On the one hand, unlicensed systems, while entirely appropriate in many situations, do not provide the necessary interference protection in more critical applications. On the other hand, licensed, longer range, more ubiquitous systems necessarily designed for use by the general public may not meet more specialized requirements. Therefore, from a public policy perspective, end users would be better served by having a third alternative -- a licensed (interference-protected) system capable of meeting the unique customer needs of a primarily local nature. The AMI/CYLINK proposal for a Specialized PCS system would provide exactly that alternative.

EXHIBIT 2

A ROBUST TELECOMMUNICATIONS MARKETPLACE:
THE MOVEMENT TOWARDS
OPEN NETWORKS ACCESSIBLE TO DIVERSE SUPPLIERS